

LISTINGS NEWSLETTER

Newsletter of the
Long Island Sinclair/Timex
Users Group
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Issue: SEPTEMBER 1996

Next LIST meeting SEPTEMBER 8, 1996

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Please send all inquiries and
submissions (including dues)
to: L.I.S.T.

Mr. Harvey Rait
5 Peri Lane,
Valley Stream, N. Y. 11581

COMING EVENTS: The next L.I.S.T.
meeting will be Sunday 3/15/'96
at 2 P.M. at the home of Harvey
Rait (see address above).

Listing Policy

Annual Dues \$16.00

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Copies provided on EXCHANGE BASIS with other bona fide user
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LIST (Long Island Sinclair Timex) Group, a not for profit user group

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ZX81
TS2068
QL

TIPS

ZX81
TS2068
QL

TIPS

ATTENTION LIST Subscribers: When it is time to renew your membership, (look at your mailing label), please make out your check to Harvey Rait, LIST President or to Robert Malloy, Treasurer. PLEASE DO NOT MAKE OUT YOUR CHECK to LIST. Our bank requires a large amount of money in a savings account in order to cash checks. THANK YOU!

Harvey Rait
5 Peri Lane,
Valley Stream, NY 11581

Robert Malloy
412 Pacific Street,
Massapequa Park, NY 11762

Due to rising postage costs outside of the United States, we must raise our annual dues accordingly:

CANADA and MEXICO \$17.50 US, and the rest of the world \$24.00 US.

Bob Malloy, LIST Treasurer

With sadness, I report that Dr. Donald A. Malooly, M.D. and long time member of LIST, passed away Monday, April 22, 1996. His wife Mary advised us that Don really enjoyed his subscription to LIST the last several years and used and enjoyed his Timex Sinclair computer for at least 12 years. May we express our sympathies for the Malloy family.

RAIT'S RAMBLINGS

I really got ticked off last week. Last year I had written about the year 2000 problem that will face many computer problems when the new millenium starts in 3 years. Basically I thought that it might only affect programs that used time/date headings or storage identifications. Last week because of the April 15 tax due date there was a rash of stories in all the media of the 2000 problem. The high point of my ire was a televised Senate hearing on CSPAN. This so called committee of computer industry gurus had the nerve to tell our Congress persons that it will cost anywhere from \$60 billion to \$600 billion to make the necessary changes in the programs that are in use now. My dear friends that is no typo the dollar amount is in Billions according to their report. They claim that every line of programming has to be gone through at \$4 to \$8 per line. Earlier programs they claim were never documented and that 3 out of 5 software companies will not be around to make their own changes.

The industry is looking for a Federal bailout for their ineptitudes as well as a golden calf (evidently left over from the story of Exodus aired last month).

Let us be reasonable, the number of programs that will be involved is miniscule compared to all the programs that are currently in use. They spoke of actuarial tables of insurance companies, banks and perhaps historic research. Big deal, that should be their problem not ours. First a show of hands. How many 100 year old people will be alive to be even remotely involved? How many insurance policies or bank accounts have to be calculated for 100 years? There really are so few that you would have to go to extraordinary lengths to even identify them.

Okay, so be that as it is here is my typical cheap and dirty fix: Instead of calling the year 2000 call it 200*, since it is the last 2 digits that they claim will cause all the problem identifying itself as 1900. When the digits 0* appear a quick subroutine would put it in the proper perspective and straighten out any confusion factor.

I am not a programmer and I am not a maven on machine code, COBOL, FORTRAN. I am however a quick study in bullcrap, and that was what I was hearing for hours on end by these dark suited mendicants

holding out their hands to the public coffers. Now I suggest that the Sinclair community jump in and volunteer to do the job at 1/2 price. I think that we should be able to increase our treasuries by a few billion bucks, and get a lot of free publicity besides. Do I hear a loud "Here,here" from our QUANTA people?

Maybe this rambling will start a ground swell. Please write your comments to me at LIST, write a letter to the editor of your local newspaper, or if you have the -er, shall we say cullions in the vernacular, contact your legislative body. My choice is my congressman Al D'Amato. He can make as big a deal out of anything. No comment on "Whitewater". I can't afford to get him angry at me.

Harvey Rait, LIST President
5 Peri Lane
Valley Stream, N.Y. 11581 USA

This an article that appeared in Newsday April 14,1996. It was written by Lou Dolinar who has written many fine articles on computer topics. This however is another boondoggle by the computer industry. We in our little world of Sinclair have learned to conserve our ROM, RAM and storage facility by the necessity of having rather low power devices.

"Maybe it is early to start printing up the bumper stickers that say "Conserve bandwidth-'Netsurf with a friend." But if John Michael Keyes has his way, that day is not too far off. Keyes, a graphic artist, wants to stop Web-site designers from wasting space and tying up the Internet's file servers, routers, fiber-optic backbones and your own little modem with corpulent photos, potbellied artwork and Rubenesque logos. To that end, he's started his own Web site for "The Bandwidth Conservation Society," to trai others in cyberdieting and digital liposuction.

"Typically you can take thirty to fifty out of a graphic file without affecting quality a bit," he says. "Just that would have a huge impact on some of the traffic on the Intrnet." The less data the the 'Net has to move, the faster Web sites load-a real consideration judging from the increasing speeds many are experiencing. Of course, you can do the same thing for yourself if you don't download graphics-an option on most browsers.

Keyes is not suggesting that anyone reduce the number or the dimensions of photos, although that might not be a bad idea, either. His point is that many trendy young Web designers don't understand the basics of how color and photos work on a computer, which is what his Web site (<http://www.infohiway.com/way/faster>) is designed to teach through an interactive tutorial. Why make your artwork more fruga? AS he writes in the tutorial: "The bottom line is the surfing syndrome. AS dial-up population grows, more folks want the images faster. Plus...by reducing the size of images a few things occur:

- 1)The developer uses less hard disk real estate.
- 2)The developer uses less CPU (computing power) overhead to deliver the image.
- 3)The user gets the image quicker! (this is the important one)
- 4)Fewer bytes accessed means more as the popularity of the 'Net grows.
- 5)Courtesy. As more folks are sharing Web-server resources, your electronic neighbors will appreciate your intelligence and Web-savvy delivery."

The basic strategy he outlines on his site involves reducing the number of colors in artwork. Image-editing programs like Photoshop accomplish

this fairly simple, he says. The tricky part is figuring out how much color can be thrown out while maintaining quality, and learning techniques that mask the tricks. Some of this is a matter of aesthetics, as in showing how to make a svelte gray background look as good as a more colorful one.

The Bandwidth Conservation Society is another one of those things that started as an in-joke six months ago on the 'Net and has since acquired a life of its own. Keyes firm, World Access of Boulder, Colo., was sharing a file server with - and suffering the consequences of- another company's bloated pages. His customers were complaining about access times. "No one likes to hear that they don't what they're doing when they design Web pages, so I had to think of a diplomatic way to call their attention to the problem." Thus was born the page and the Bandwidth Conservation Society. Since then, thousands of people have stumbled onto his Web site, which now hosts a large and active discussion group about ways designers can shrink and speed up their graphic files. "It is about to become an honest organization. I'm sorting through five months of e-mail, and we've got a couple of dozen regular contributors who will help run it. We'll also ask people to contribute something before they can call themselves members-not money, but intellectual contributions, or put our logo on their Web page." Increasingly, Keyes finds the group is getting aggressive about ridiculing bandwidth wasters. It has begun hotlinking to particularly lavish sites, naming, for example, The Discovery Channel, with a home page that can take minutes to load, as among particularly egregious "Dogs and Hogs." There are also hotlinks to sites using various techniques to speed up graphics. Says Keyes, who also teaches graphics design at the Colorado Institute of Art, "It's been fascinating to see how something like this (his page) contributes to the world's knowledge of the subject. The newest, greenest people can usually give a veteran something they didn't know. I've learned five or six new tricks from the forum." * @ Lou Dolinar can be reached at Newsday, 235 Pinelawn Rd., Melville, N.Y. 11747-4250 or by e-mail to : Dolinar@aol.com or pluggedin@prodigy.com.

HR comment- another bit of fascinating news that the Sinclair world has known about since Spectrum days.

1900. When the digits 0* appear a quick subroutine would put it in the proper perspective and straighten out any confusion factor.

I am not a programmer and I am not a maven on machine code, COBOL, FORTRAN. I am however a quick study in bullcrap, and that was what I was hearing for hours on end by these dark suited mendicants holding out their hands to the public coffers. Now I suggest that the Sinclair community jump in and volunteer to do the job at 1/2 price. I think that we should be able to increase our treasuries by a few billion bucks, and get a lot of free publicity besides.

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QL CORNER

Quanta Library - Update 06/96

The June update for the Quanta library contains 18 disks, 12 are replacement disks (additional programs added to these disks) and 6 additional disks (new disks for the library). Library disk LG 01, has been updated and includes these changes.

The following is a summary of the changes made for your information.

DISK No.	Action
LG 01	Updated 06/96. Now includes in the Graphics (GR) Group, more LineDesign/Clipart disks held by the Head Librarian only.
UG 07	J_DIRECTORY. Ex-Commercial program from J. Hafke
ED 04	GENEALOGY . Dillyn Jones
ED 05	GENEALOGY . Dillyn Jones
ED 06	HACKERS JOURNAL
GR 04	VISION MIXER PLUS & PICTURE MASTER. Ex commercial program from Joe Hafke.
GS 10	WAR. John Miller
MA 01	CONVERT. Ex commercial program from Joe Hafke
PF 03	PRINT MASTER PLUS. Ex commercial program by Joe Hafke
SP 03	REMINDER. Ex commercial program by Joe Hafke
SP 09	HOME BUDGET. Ex commercial program from Joe Hafke
UG 01	SCREEN PARAMETERS. Upgrade of program from Bruno Coativy, also ATARI from Jon Slater
UG 05	NEKOT. by John Miller added
UG 06	COMPARE. by John Miller added, and UTILS now removed to UG 15 and upgraded
UG 11	FILES PLUS. Ex commercial program from Joe Hafke
UG 14	SUGGEST. by Les Wareham
UG 15	UTILS. Upgrade from Dennis Cmelik
UT 01	SCREEN PARAMETERS. Upgrade from Bruno Coativy

PLEASE ALSO NOTE and ACTION:

Please check the BOOT program on PS 06 (XCHANGE) and ensure that line 290 has been changed from 'win1_utils_' to read 'flp1_'.

If any QUANTA member would like to order any of the above updates to the QUANTA library: You can send me a list of library disks you require, enclose 720K, formatted disks, in a servicable package with return postage or I can supply formatted 720K disks at 40 cents each plus postage cost.

Bob Gilder, 69 Jefferson Place, Massapequa, NY 11758.

The following internet file was down loaded by Bob Malloy.

From bmalloy@chelsea.ios.com Wed May 26 23:22:00 1996

Status: RO

X-Status:

Date: Sun, 26 May 96 23:22:00 CET

Subject: Bedford, USA Show

Message-ID: <MSGID_2=3A252=2F67.0_42967646@fidonet.org>

From: Tony_Firshman@f67.n252.z2.fido.sub.org (Tony Firshman)

Path: news2.ios.com!news.ios.com!uunet!in2.uu.net!tank.news.pipex.net!
pipex!newsfeed.internetmci.com!howland.reston.ans.net!surfnet.nl!swsbe6
.switch.ch!scsing.switch.ch!news.belwue.de!fu-berlin.de!cs.tu-berlin.
de!informatik.uni-bremen.de!nordwest.pop.de!n

X-Gate: MausGate/News 1.27b1/h
Newsgroups: maus.sys.ql.int
X-Gateway: ZConnect CL trashcan.mcnet.de [Connectline/AmigaOS], RFC1036
/822 UH ldb.han.de [UUCPfZ V5.73 U002]
Lines: 159

Afficianados of shows will know (even if not by direct experience) that there is always a story to tell.

The one this time is about rain and rain and rain.....

We were warned by all and sundry before we (Stuart and I) left on our fold up bicycles that it had been raining for weeks - did we want a lift?

____NO____

He he - on that Thursday evening in Boston we had second thoughts.

We landed to a dry Boston, but there were a few spots of rain.

By the time we left the airport it was bucketing down. On with my leggings, kagool and spare 'waterproof' shoes. How clever I am (like the pieman) I thought.

We were hooted off the road by a pistol wielding cop - not the time we thought to tell him that we came out the only signposted way. Where is the road to Revere? I won't print his reply. The 'aarsoles' we heard from a lorry driver to the meek old lady driver 3 years ago was nothing. Welcome to America!

OK we found the services road, and sailed out of the Airport - to get immediately lost. Well it was raining and the great bike map (kindly provided by Al Boehm) showing the direct bike route to Bedford on the Minuteman railway (deceased) turned out to be on loo paper (really). We had to take very brief looks at it, as each time less would unfold. We took the drunken route to the start of the cycleway (ie try every blind alley and side turning and try to go in the opposite direction).

We asked a local resident (we knew we were close) - 'dunno'. It was at the end of his road. We carried on down - but it was ending. Is this the Minuteman cycle path (to some walkers actually on the path) - 'Never heard of it'

Went the wrong way up a bus station road (Look at \$50,000 dollar fine notice Stuart quipped <I noted later it was \$50.00 - exactly - not a cent more or less. Accurate chaps these Americans>).

Incidentally they love their signs. Not a moment passes without some detailed instruction on what to do, what not to do, what to think and not to think. You get the picture. They also like to quote the statute 236 sub-section 236a Article 9 1956 - even on no smoking notices.

Oh that reminds me. Have you seen the ludicrous questions on their visa waiver form. I do not kid:

Are you a terrorist? ☐ yes ☐ no

Did you perform mass genocide between 1939 and 1945? ☐ yes ☐ no

Well any self respecting terrorist or Nazi wouldn't lie would he/she.

... and so on. They must think visitors are loopy (don't answer that one please)

Stuart and I risked suicide by answering flippantly.

I put [] N/A against the genocide question (I wasn't born - just).
Can't remember what Stuart put, but he must have fooled them.

Oh yes - back to the shoes. Yes they are waterproof - but against water from below. The water running down my very waterproof leggings ran straight in, and (yes you guessed it) didn't run out. Squelch Squelch.

Back to the trail; where was I. Oh yes the Minuteman railroad ran out in Jerry's Pond. Well it was in a derelict wasteground. 'Where are we' to a person at the bus shelter - 'in a playground'!

We started to to try to find any useable bits of map. Any bits we found (all completely soggy and very fragile) that appeared relevant were stuck onto the bus shelter. Any others ended up in a papier mache ball. I then proceed to assemble a vital jigsaw puzzle. There was a bit still missing - ah there it was on the back of a sliver, like a chameleon on another part of the Boston map. I found some dry A4 in my rucksack - and wonder upon wonders, a waterproof sealable map holder. Well no - but it was a plastic sealable container for Bill Richardsons precious Z88 keypads. Well what would you have done then?

Amazingly we not only had the schematic for most of the Minuteman but also the detailed map of the area of Boston we were in. Where is the bike path (to our incredulous companion in the shelter) - 'Dunno'.

I guess they all thought we were mad and didn't want to get involved. 'We are going to Bedford' 'Neva hoid of it'

Hrrmmm.

Went a bit further on - 'Where are we?' 'Dunno but I live just over there'

We were in fact about 5 minutes from Alewife where the Minuteman starts. This was 3 hours after leaving on the 30 minutes ride from the airport to the path. We were both beginning to feel frozen, wet, cold, hungry (will come to that later) - where was Al Boehm <grin>

Anyway we got to the path - and that was it. Straight riding all the way to Bedford - and we met only one other cyclist. No wonder no-one has heard of the path (see later).

Got to Bedford Ramada Inn about 10pm. We looked like visitors from outer space (really) and the receptionist's face was a picture. You cycled.... from Boston .. all the way ... and the mandatory 'What cycle path?'

Ah well - the best cycle path we had ever come across - far far better surface than the roads. Pity no-one uses it (see later).

We squeezed ourselves dry, de-thawed in baths, and laid out our clothing, steaming, on every available surface.

Plugged my dry switched mode power supply in - it blew (Great diagnosis by Don Waltermann at the show - and one power transistor and a fuse when I got home got it going).

To reception - 'Where can we eat' '3 miles down the road' 'Are you kidding!' We walked for what seemed like miles to the local supermarket (a mall opposite the hotel with a motorway speed car park) for cold soggy (a par for the course) fried chicken. I had been dreaming of a large steak and fries all the way from Boston. Ah well, lets get drunk instead - 'Bar closes in 5 minutes'

< meeting happened here. Very very good but will leave the details to others>

I liked Al praying, during grace, to God for the future of the QL. Nice to have Him on our side <grin>

Robin and I got rowdy at the singsong (drunk at last)

Well the cycle ride home was pretty uneventful, but there were hundreds and hundreds of roller bladers on the way back. No wonder no-one knew where the 'cycle path' was.

(It was called the Minuteman cycle path - honest)

It didn't rain at all.

--- Pbox v1.08

* Origin: QBBS (+44) 1344-890987 (2:252/67.0)

QL SHOW IN 1997 INCLUDES ALL SINCLAIR SYSTEMS by Timothy Swenson

[All of Sinclair lives! Apparently, from LIST members who went, the May 1996 QL show in Massachusetts was a sellout success! But many attendees asked, "Hey!, What about the other Sinclair machines?". Interested? Tell Swenson to go-go-go at SWENSOTC@SD2.WPAFB.AF.MIL. Editorial comments are in square brackets.]

At the last North American QL show in Bedford, MA there was some discussion of the next show. Someone suggested that the show be opened up to all Sinclair computer users. This would include ZX81, T/S 1000, T/S 2068, and Z88 (not many Spectrums in the US). [Yes, there are! Every TS2068 by now has a Spectrum ROM emulator fitted in it. And don't forget the IBMs running Spectrum emulators!]

Before any serious planning is done to do this, I need to survey North American Sinclair users to see if they would attend such a show. The show would probably have some featured speaker of each computer (don't know if much is going on for the ZX81). [Hey!, that's what LIST is for.]

The next show would still be on the East Coast. The plan is to have someplace 3-4 hours drive away from New York. [How about in the City?]

Are there any ZX81, T/S 2068, and Z88 users that would be interested in attending? If so, send me some e-mail and some comments. I will forward it on to whom ever is planning the next meeting.

See you in September... Bob Gilder



Author: J.T. Beaumont G3MGO

CALCULATING THE RESONANT FREQUENCY OF A TUNED CIRCUIT USING THE ZX81

This simple program for the ZX81 described below, will calculate the resonant frequency of a tuned circuit from known values of inductance and capacitance, or calculate the value of an inductor or a capacitor in order to resonate a tuned circuit at a required frequency — useful when designing oscillators and traps.

The program is based on the formula:

$$F = 1/2\pi\sqrt{LC}$$

which works for both series and parallel resonant circuits.

Using the Program

RUN the program and in response to the input prompts, type in the data. The program is self-explanatory asking you to input appropriate data.

An inductance of 250μH is to be con-

nected in parallel with a variable capacitor of maximum value 160pF and minimum value 40pF. What is the tuning range of the circuit? Use the program to find out.

In addition to using the program for designing series-resonant circuits (acceptor circuits) and parallel tuned circuits (rejector circuits), it should be an asset to students studying for the RAE when checking their answers to calculations.

```

5 REM *#TO START PRESS "RUN"
10 PRINT "-----"
11 PRINT "-----"
12 PRINT "-----"
13 PRINT "-----"
14 PRINT "DO YOU WANT TO CALCU"
15 PRINT "THE INDUCTANCE? (YE"
16 PRINT "S/NO) "
21 INPUT A$
22 PRINT
23 IF A$="YES" THEN GOTO 49
24 PRINT "DO YOU WANT TO CALCU"
25 PRINT "THE CAPACITANCE? (Y"
26 PRINT "ES/NO) "
27 INPUT B$
28 IF B$="YES" THEN GOTO 1000
29 PRINT
30 PRINT "DO YOU WANT TO CALCU"
31 PRINT "THE FREQUENCY? (YES"
32 PRINT " /NO) "
33 INPUT C$
34 IF C$="YES" THEN GOTO 2000
35 CLS
36 IF C$="NO" THEN GOTO 20
37 CLS
38 PRINT "*****TO CALCULATE THE I"
39 PRINT "NDUCTANCE IN MICRO HENRIES*****"
40 PRINT
41 PRINT "INPUT FREQUENCY ""IN"
42 PRINT "MHZ. ""
43 INPUT F
44 PRINT "FREQ IS ";F;" MHZ."
45 LET F=F*10**6
46 LET F=F**2
47 PRINT
48 PRINT "INPUT VALUE OF CAPAC"
49 PRINT "ITANCE IN PF. "
50 INPUT C
51 PRINT "CAPACITANCE IS ";C;"
52 PRINT "PF."
53 LET C=C*10**-12
54 LET A=4*(PI**2)
55 LET X=A*F*C
56 LET L=1/X
57 PRINT
58 PRINT
59 LET Z=L*10**6
60 LET Z=INT (Z*10+.5)/10
61 IF Z<=0 THEN GOTO 1480
62 PRINT "INDUCTANCE IS ";Z;"
63 PRINT "MICRO-HENRY"
64 GOTO 3160
65 CLS
66 PRINT
67 PRINT "*****TO CALCULATE THE C"
68 PRINT "APACITANCE*****"
69 PRINT
70 PRINT "INPUT FREQUENCY ""IN"
71 PRINT "MHZ. ""

```

```

1100 INPUT F
1120 PRINT "FREQ IS ";F;" MHZ."
1132 LET F=F*10**6
1133 LET F=F**2
1135 PRINT
1140 PRINT "INPUT VALUE OF INDUC"
1141 PRINT "TANCE IN UH. "
1150 INPUT L
1160 PRINT "INDUCTANCE IS ";L;"
1161 PRINT "UH."
1162 LET L=L*10**-6
1200 LET A=4*(PI**2)
1250 LET X=A*F*L
1260 LET C=1/X
1270 PRINT
1295 LET Z=C*10**6
1400 PRINT
1410 LET Z=C*10**12
1450 LET Z=INT (Z*10+.5)/10
1480 IF Z<=0 THEN PRINT AT 15,0;
1481 "-----"
1485 IF Z<=0 THEN GOTO 3160
1500 PRINT "-----";Z;
1501 PRINT "PF"
1600 GOTO 3160
2000 CLS
2050 PRINT "TO CALCULATE THE FRE"
2060 PRINT "QUENCY OF A TUNED CIRCUIT"
2070 PRINT
2080 PRINT "INPUT VALUE OF CAPAC"
2090 PRINT "ITANCE PF."
2095 INPUT C
2096 PRINT "CAPACITANCE ";C;"PF."
2100 LET C=C*10**-12
2200 PRINT
2290 PRINT "INPUT INDUCTANCE IN"
2300 PRINT "MICRO HENRY"
2310 INPUT L
2320 PRINT "INDUCTANCE ";L;" UH."
2330 LET L=L*10**-6
2400 LET A=4*(PI**2)
2500 LET X=C*L*A
2550 LET Z=1/X
2600 LET F=SQR Z
2725 LET F=F/10**6
2730 LET F=INT (F*1000+.5)/1000
2750 PRINT
2800 PRINT "-----"
2810 PRINT "F. ""MHZ."
3160 PRINT AT 15,2;*****TO RETURN
3161 TO START*****
3165 PRINT AT 20,7;"THEN NEWLINE
3170 INPUT X$
3175 IF X$="X" THEN CLS
3180 GOTO 20

```



DESIGNING METERS USING A SPECTRUM

Now is the time to convert that "surplus milliammeter" in the "junk box" into a useful multimeter. Today, instruments can be costly items and young electronics enthusiasts tend to purchase the cheapest instrument, usually with a low sensitivity.

The complete program enables the value of "Shunts" and "Multipliers" to be calculated using a ZX81 computer, and will enable a milliammeter to be converted to read either as a Voltmeter or as an Ammeter. The connections and shunt or

multiplier values are shown as the program "runs". Only the ammeter section of the program is reproduced here. The complete program is available on *PW Radio Programs—4 cassette*.

When the program has been entered it should be **SAVED** on tape; the instruction being **GOTO 1400**. On completion the program will "self-run" and go to line 10.

The prompt at line 120 will ask if the basic milliammeter is calibrated in Amperes, Milliampères or Microampères, line

160 being to ensure validity of data.

The program to extend the range of an ammeter is contained in lines 280-640. Input the internal resistance of the movement at line 410 and then the "full scale deflection current" (f.s.d.) as requested.

At line 530 the "new current" required is input in amperes. (Note: to extend the range in milliamperes: $1\text{mA} = 0.001\text{A}$). The value of both the shunt resistance and its power rating is then displayed. **ENTER** will start the program again.

```

5 GO TO 1430
10 PRINT "-----"
15 PRINT "-----"
20 PRINT "-----"
30 PRINT "Is instrument f.s.d."
  in:
40 PRINT "a. ""amperes (A)""
50 PRINT "b. ""milliampères"
  (mA) ""
60 PRINT "c. ""microampères"
  (µA) ""
70 PRINT "Select letter"
80 PRINT "then ENTER."
90 LET a=0
100 INPUT S$
110 IF S$="a" THEN LET a=1
120 IF S$="b" THEN LET a=1E-3
130 IF S$="c" THEN LET a=1E-6
140 IF a=0 THEN GO TO 110
150 CLS
160 PRINT "-----"
170 PRINT "-----"
180 PRINT "-----"
190 PRINT "-----"
200 PRINT "-----"
210 PRINT "-----"
220 PRINT "-----"
230 PRINT "-----"
240 PRINT "-----"
250 PRINT "-----"
260 PRINT "-----"
270 PRINT "-----"
280 PRINT "-----"
290 PRINT "-----"
300 PRINT "-----"
310 PRINT "-----"
320 PRINT "-----"
330 PRINT "-----"
340 PRINT "-----"
350 PRINT "-----"
360 PRINT "-----"
370 PRINT "-----"
380 PRINT "-----"
390 PRINT "-----"
400 PRINT "-----"
410 INPUT R

```

```

420 PRINT AT 8,16,R;"R"
430 IF S$="a" THEN LET a$="A"
435 IF S$="b" THEN LET a$="mA"
440 IF S$="c" THEN LET a$="µA"
450 PRINT AT 8,11;a$
460 PRINT AT 20,1;"How many ""
  a$ "" is the f.s.d.?"
470 INPUT C
480 PRINT AT 8,10,C;a$
520 PRINT AT 20,1;"Input new f."
  s.d. in amperes
530 INPUT N
540 PRINT AT 12,0,N;"A->"
550 LET S=N-(A+C)
560 PRINT AT 16,0,S;"A"
570 LET V=R*C*A
580 LET X=V/S
590 LET X=INT (X+10000+.5)/1000
600 PRINT AT 20,1;"Shunt resist"
  ance = ""X;" ohms
610 LET U=S+2*X
620 LET U=INT (U+100+.5)/100
630 PRINT AT 21,1;"Voltage of s"
  hunt = ""U;"V"
640 PAUSE 1000
650 CLS
660 CLEAR
670 GO TO 10
1410 CLS
1420 SAVE "METERS" LINE 1425
1425 CLS
1430 PRINT "-----"
1440 FOR J=1 TO 16
1450 PRINT TAB 3;"#";
1460 PRINT TAB 26;"#";
1470 NEXT J
1480 PRINT "-----"
1490 PRINT AT 3,0;"-----"
1510 PRINT AT 4,0;"-----"
1530 PRINT AT 9,11;"Written by"
1535 PRINT AT 11,7;"J.T.BEAUMONT"
  - G3NGD"
1535 PRINT AT 15,5;"©1983 IPC Ma"
  gazines Ltd"
1537 PRINT AT 13,5;"for PRACTICA"
  L WIRELESS"
1540 PAUSE 1000
1550 CLS
1560 GO TO 10
1565 RUN 1430

```

LISTINGS NEWSLETTER

Newsletter of the
Long Island Sinclair/Timex
Users Group
=====

Issue: SEPTEMBER 1996

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Please send all inquiries and
submissions (including dues)
to: L.I.S.T.

Mr. Harvey Rait
5 Peri Lane,
Valley Stream, N. Y. 11581

COMING EVENTS: The next L.I.S.T.
meeting will be Sunday, 10/13/96
at 2 P.M. at the home of Harvey
Rait (see address above).

Listing Policy

Annual Dues \$16.00

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LIST (Long Island Sinclair Timex) Group, a not for profit user group

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QL CORNER

Review of the QLBoston show:

Saturday morning, at six AM, I picked up Harvey Rait at his home for what was to be a most enjoyable weekend. We made it to the Bedford Ramada Inn, approximately 4 and a half hours. Checking in at the Ramada desk, we were advised that we would have to wait until 2PM for our room. We then proceeded to trek on and up to the show which was held on the third floor.

A table was set up as a hospitality and/or welcoming area; we signed our names, we selected our QLBanquet meal, fish our foul and we were supplied with a pin-on name plate. To our left of the table, there was a room with coffee and tea service for the attendees. On our right was the main hall with QL vendors tables on two sides of the room, QL enthusiasts and another table with an overhead projector and a screen on the wall, providing a large image for demonstrations.

The QL vendors at the show were Frank and Carol Davis (FWD Computing), Stuart Honeyball, Tony Frishman, Tim Swenson, Jochen Merz, Robin Barker and Albin Hesler, Don Waltermann and John Impellizzeri of QBOX-USA.

There were some interesting demonstrations, such as QBOX and the one demonstration that I thought was outstanding was an IBM software emulator running on a 486 Notebook computer. I don't recall how fast the speed of the Notebook was for this demonstration.

The evening QLBanquet was excellent, the food was abundant and everybody had a great time. A QL_Quorum consisting of notable QL vendors were asked questions pertaining to the QL. Next was a Sing Along which was pleasant. Harvey, Joe and myself decided that it was time to retire, since it really was a long day ... and again, most enjoyable!

All in all, it was well worth the time and expense attending the QBoston QL show. AL Boehm asked LIST members if they would host next years show in New York which would be an all Sinclair Show.. I told AL that Bob Dyl requested LIST to host the first two shows. What we found was that most hotel bookings of this sort required well over a year in advance. And the hotel rates seemed to be prohibitive. We tried to find a hall in the outer five boroughs and Long Island. I also mentioned to AL that there are only five members of LIST living in New York and the remaining LIST members are scattered through the U.S.A., Canada and Europe. We would need help if we took on a commitment for next years show. Perhaps the CATS group would be able to host the 1997 show?

I have just received Volume 1, Issue 2 of QL TODAY. Miracle Systems is back in business manufacturing QXL hardware emulators. The latest version is the QXL2 which operates at 25 Mhz (the original QXL operated at 20 Mhz). The 25Mhz QXL2 clock speed provides an increase in application speed of about 35% rather than the expected 25% for the same reason that the GOLD Card and Super GOLD Card appear to go faster than they should. The processor is interrupted at the same regular rate to trigger the scheduler, etc. regardless of the clock rate. The time that this interrupt routine takes to execute is reduced by the increased clock rate and therefore leaves more time for the application to run. This means the application is not only running at a higher

✓ clock rate but it is also given more time between interrupts to actually run and so gets a double boost in speed.

QXL2 with 4Megs of Ram '294.00; with 8 Megs of Ram '395.00 UK; outside Europe '255.00. Miracle Systems Ltd, 20 Mow Barton, Yate, BS17 5NF, UK. Telephone and Fax: +44 (0) 1454 883602. Visa and Mastercard accepted.

On page 10 of the same issue of QL Today is an article on how to speed up your QXL by Terry Harman, Northampton, England. Terry states that he is now running his QXL at 32Mhz with a replacement crystal oscillator. The original crystal oscillator (a plug in socket device on the QXL PC board) is a standard 20 Mhz oscillator. He replaced the original crystal oscillator with a 40 Mhz oscillator and it now runs just under twice the original speed. He found that he could operate with the 40 Mhz oscillator for approximately two to three hours and then then the QXL stopped operating.

Then he purchased a 586 CPU heatsink with a fan, spread some heatsink compound on the chip marked "QXL GLUE" and the QXL operates quite normally. Terry's computer is a 486 DX4, 100 Mhz machine. He has changed the crystal oscillator again (80 Mhz) and finds the QXL operates 150%, 2 1/2 times faster than the original QXL. Remember, when you modify your QXL for a faster output, you do it at your own risk and it may lead to a loss of warranty!!!!

USA QL users who wish to try this modification on your QXL, you can order a 40 Mhz oscillator from Marlin P, Jones and Assoc, Inc., P.O. Box 12685, Lake Grove, FL 33403-0685. They carry two sizes of the 40 Mhz oscillators, full or 1/2 size and both will fit the socket on the QXL. Full size 40 Mhz oscillator # 5927-CY, 1/2 size 40 Mhz oscillator # 7046-CY each \$3.50. A 586-90 CPU Cooler (a heat sink and fan) \$9.95 # 6922-FN. For orders call: 1-800-652-6733 or by fax: 1-800-432-99937.

QL Today is published bi-monthly; subscription rates from England are '25.00 for six issues from the time you subscribe to the publication. Miracle Systems and Jochen Merz are co-publishers of QL Today. The editor for this publication is Dilwyn Jones. The publishers of QL Today would like American writers to please submit articles for their new publication. Send your manuscripts to Miracle Systems.

It is obvious that all of our QL clubs are loosing members; some going to greener pastures of the IRM fraternity; some giving up their QL computers for other activities and some passing on. To insure QL success for the future we should support development of hardware manufactures and subscribe to publications which provides QL news. The New England Sinclair QL User's Group publishes a newsletter, 6 times a year, 20 pages of all QL content. Annual membership is \$12.00 for USA and \$20.00 for the rest of the world,

Tim Swenson has a new QHJ Freeware catalog, with many pages of QL programs/utilities, some Z88 files and 2068 files. All files are archived in zip, lzh, lha, jhq, and zoo. Do not let it scare you - unpacking files has now become easier. Order Acp2e3_zip, Achriver Control Panel. All QHJ Freeware files can be accessed on QBOX-USA, 810-254-9878, 24 hours, 300 thru 14400 Baud - or you can order a catalog from: Timothy C. Swenson, 5615 Botkins Rd., Huber Heights, OH 45424 - Telephone: 513-233-2178. Ask for the QHJ Freeware catalog. See you next month... *Bob Gilder*

.....

Perhaps you might be interested in ZX81 magazines:

- 1K-Intelligenz, die zweite = some ideas about intelligence in 1K RAM
- Energiesparseparator = energy saving separator
- Doppelte Kapazität für Floppy = hints for double sided floppy
- Neues aus aller Welt = news world-wide
- ZX81 Programme auf CD-ROM = april development
- Mitgliederliste = complete list of all members
- CeBIT 96 der Oldietreff = 8-bit-oldie-meeting
- Projektvorstellung: ZX-Giant = new memorycard with 72K (E)EPROM, 72K RAM
- Problem Bus-Steckverbinder = problems with bus connector
- Autostartmodul = some ideas about auto-start
- Vorschläge zum LCD-Modul = some ideas for the LCD-module

PAGE - 4 -



By J.T. Beaumont G3NGD

WINDING SINGLE LAYER COILS USING THE ZX81

This program was written as a follow-up to the program "Calculating the Resonant Frequency of a Tuned Circuit Using the ZX81". It was decided that having calculated the inductance required to make a tuned circuit, the next logical step was to calculate the number of turns of wire to wind on the former.

The computer program listed here will calculate the number of turns required to wind either an "Air-spaced" or a "Dust-cored" coil. It should be noted that the variation in inductance using "Dust-iron" or "Brass" cores depends on the winding length and the core composition, and there is no exact correction factor. As a rough guide, a "Dust-iron" core will give a maximum inductance of twice the "Coreless" inductance and a "Brass" core a minimum inductance of about 0.8 times the "Coreless" inductance.

Using the Program

RUN the program and a list of wire gauge options will appear on the screen. Having

decided on the gauge of wire, the coil diameter has to be entered in millimetres. At line 4081 an input prompt asks if a "dust-slug" is to be used. This "slug" is assumed to be three-quarters of the way into the coil and the program adjusts accordingly.

Finally, on inputting the inductance required, the number of turns are calculated and displayed on the screen.

Practical Example

Designing an antenna "Trap" coil

A parallel circuit comprising a coil and a 50pF capacitor is required to resonate at 3.7MHz. If the coil is to be wound on a 38.1mm diameter former using 20 s.w.g. enamelled copper wire, calculate the number of turns.

From resonant frequency program based on the formula $F = 1/2\pi\sqrt{LC}$ the inductance was calculated to 37μH. When this value was input to this program the answer was 37.2 turns.

This program should be of value to amateur radio enthusiasts who enjoy building their own equipment. This program could be added to the resonant frequency of a tuned circuit program and the cassette tape *PW Radio Programs-4* features the combined programs.

Rewriting Programs

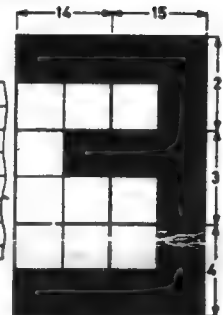
The programs listed in this Special Feature can be easily rewritten for either Spectrum or ZX81 computers since no machine code is involved. The Radio Range program for Spectrum uses a PLOT and DRAW routine. For the ZX81 this becomes:—

```
120 FOR A=0 TO 1*PI STEP PI/50
130 PLOT 30 + 30 * COS A, 10 + 20 * SIN A
140 NEXT A
150 SLOW
```

Translation into other BASIC dialects should not prove difficult to perform, only the graphic presentation should need really thinking about.

```
4000 PRINT "-----"
4001 PRINT "-----"
4005 PRINT "12 SUG" "28 SUG" "14
SUG" "30 SUG" "16 SUG" "32 SUG"
"18 SUG" "34 SUG" "20 SUG" "36
SUG" "22 SUG" "38 SUG" "24 SUG"
"40 SUG" "26 SUG" "42 SUG"
4008 PRINT AT 11,5; "-----"
4009 LET N=0
4010 INPUT S$
4035 IF S$="10" THEN LET N=7.48
4036 IF S$="12" THEN LET N=9.89
4037 IF S$="14" THEN LET N=11.78
4038 IF S$="16" THEN LET N=14.8
4039 IF S$="18" THEN LET N=19.7
4040 IF S$="20" THEN LET N=26
4041 IF S$="22" THEN LET N=33
4042 IF S$="24" THEN LET N=41.8
4043 IF S$="26" THEN LET N=50.3
4044 IF S$="28" THEN LET N=61
4045 IF S$="30" THEN LET N=72.8
4046 IF S$="32" THEN LET N=82.8
4047 IF S$="34" THEN LET N=95.2
4048 IF S$="36" THEN LET N=110.3
4049 IF S$="38" THEN LET N=144.9
4050 IF S$="40" THEN LET N=178.6
4051 IF S$="42" THEN LET N=212
4052 IF N=0 THEN GOTO 4010
4056 PRINT AT 11,5; "-----"
4057 S$=" "
4060 PRINT AT 13,5; "ENTER COIL D
IAMETER = MM"
```

```
4069 PRINT AT 14,0; "-----"
4070 PRINT AT 15,0; "-----"
4071 PRINT "-----"
4073 PRINT "-----"
4074 PRINT "-----"
4077 INPUT R
4078 LET P=R+.03937
4079 LET D=D/2
4080 PRINT AT 13,5; "-----"
4081 PRINT AT 15,2; "-----"
4082 INPUT B$
4083 IF B$="YES" THEN PRINT AT 1
6,2; "-----" THE COIL IS "SLUG- TU
NED"
4084 IF B$="YES" THEN GOTO 4087
4086 PRINT AT 16,2; "-----" AI
R SPACED-----"
4093 PRINT AT 16,0; "INPUT MICROH
ENRYS = "
4094 INPUT J
4095 IF B$="NO" THEN LET H=J
4097 IF B$="YES" THEN LET H=J/1.
5
4098 PRINT AT 16,8; "-----" =
J, UH
4100 LET U=(H*5)/(P*2*N)
4120 LET E=(.36+(N*2*P*3)/H)+1
4130 LET G=(SOR E)+1
4140 LET U=U*G
4145 LET U=INT (U*10+.5)/10
4150 PRINT AT 21,0; "-----" U, " T
URNS OF -----"
```



WRM920

```

295 PRINT AT 5,18;"I"
300 PRINT AT 7,1;"Operated from
";a$
310 PRINT AT 8,15;b$
320 PRINT AT 10,1;"Confirming 0
SO with ";c$
330 PRINT AT 12,1;"At ";d$
340 PRINT AT 12,9;"GMT on ";e$
350 PRINT AT 12,25;"Using ";f$
360 PRINT AT 13,1;"the ";g$
370 PRINT AT 13,9;"MHZ band in
";h$
380 PRINT AT 13,25;"mode"
390 PRINT AT 15,1;"UR RST ";i$
400 PRINT AT 15,11;"Rig hf is
";j$
410 PRINT AT 15,1;"Antenna-";k$
420 PRINT AT 15,22;"Power ";l$;
"U"
430 PRINT AT 18,1;"VI MNI TNX F
ER FB 050 ";m$
440 PRINT AT 19,1;"Pse QSL ";n$;u$
450 IF m$="OM" THEN PRINT AT 20
,24;"73"
460 IF m$="YL" THEN PRINT AT 20
,24;"88"
470 PRINT AT 20,27;" Dave"
478 INPUT r$
480 IF r$="T" THEN GO TO 520
485 CLS
490 PRINT AT 3,5;"G4DTU QSL Car
d Printer"
500 PRINT AT 5,2;"Please select
from this list"
510 PRINT AT 8,3;"1 to enter al
l information"
520 PRINT AT 10,3;"2 to enter 0
SO info. only"
530 PRINT AT 12,3;"3 to termina
te processing"
538 INPUT r$
540 IF r$="1" THEN GO TO 5
550 IF r$="2" THEN GO TO 155
560 IF r$="3" THEN CLS
561 PRINT : PRINT " Glad to ha
ve been of service"
570 PRINT
580 PRINT "73 de Dave (G4DTU)"
600 STOP
900 COPY
910 GO TO 485
1000 SAVE "QSL CARDS" LINE 5

```


32K SRAM FOR THE ZX81 by Wilf Rigter

[This article came with a lengthy discussion of the various ways to attach extra RAM to the ZX81. Taken from COMP.SYS.SINCLAIR and spot edited by John Pazmino. Wilf Rigter is at RIGTER@CAFE.NET.]

Here is my tried and proven idea for full decoding of a 32K SRAM chip in the ZX81 memory map:

As you know the ZX81 uses an incomplete decoding scheme for RAMCS and ROMCS. This was not just to save money but is also related to the way that the video display is generated. In a nut shell the video circuit in the ULA is activated when any program is "executed" above 32K.

Strange as it sounds, the display file is literally "executed" by a JP (DFILE+32K). If you attempt to decode 32K SRAM in the 16K to 48K area without an echo in the 48-64K area the thing will crash since it will "execute" the DFILE above 48K but won't be able to access it. The trick is to create a "conditional echo" which decodes the 48K-64K area to the 16K-32K area only if the M1 signal is present.

M1, which is active low when an opcode is fetched (remember [it is] "executing" the DFILE), can be combined with A14 and A15 to enable the RAM chip as though it is mapped in the 48-64K area. Now you can have the SRAM mapped anywhere in the memory map without problems. Most RAM projects include M1 decoding but I think you will like my favorite circuit for this application using the 74HC251 as shown below.

It is designed to be mounted on a small piece of perf board with feedthrough PCB connectors to plug into the rear of the ZX81. The RAM WR, Data and Address lines are also connected to the corresponding edge connector lines.

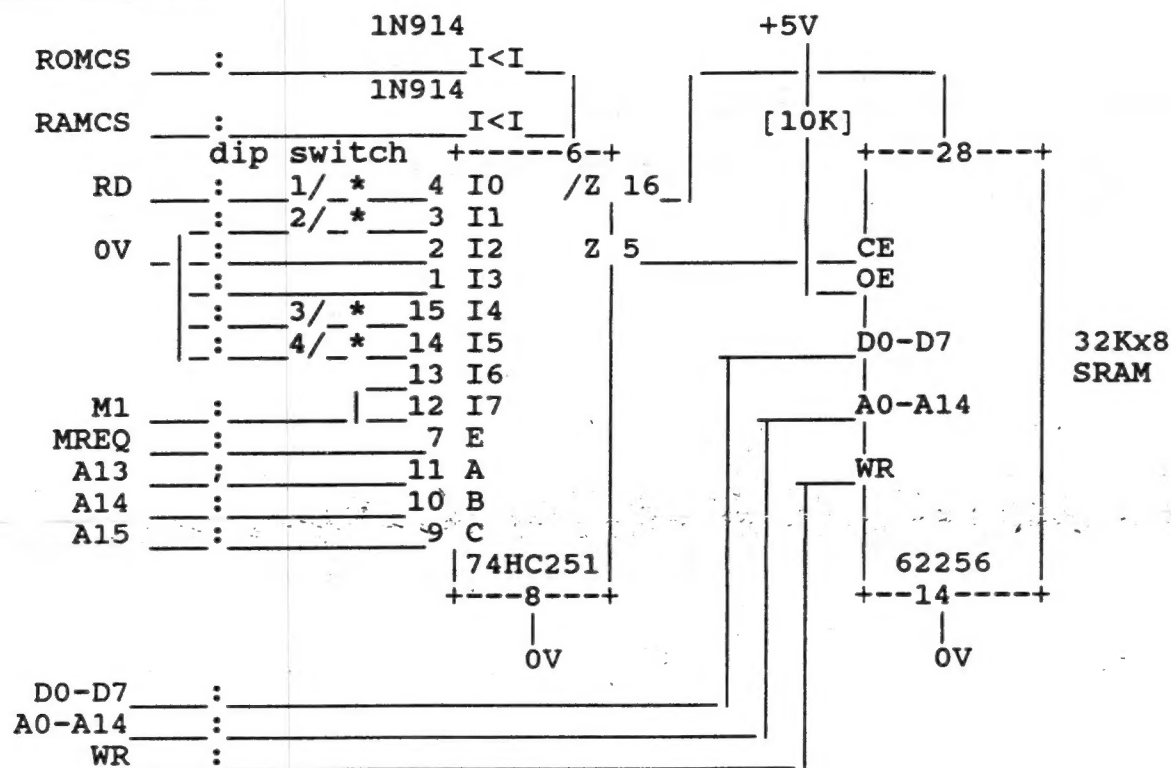
The DIP switch is used to select 8K segments in the memory map from 0-48K. Yes, it's true, you can overlay the ROM (S1) and still have video because the character pattern data is fetched with RD high which disables the RAM 0-8K segment and reads the data from the ROM. Now you can install those nice features in the ROM like function keys for 0-9 and auto running BASIC from power up (just what you need for control applications) and it is write protected to boot. You can even install new printer character patterns or a little program in the 7680-8191 area (I keep my RAMDOS there). Because the 0-8K is a write protected RD only RAM segmen, you have to load the ROM overlay data at location 32-40K (S5). [By the way,] the internal RAM is now accessable in 48-64K segment.

The logical configurations are: 0-32K (S1+2 closed) 8K-40K (S2+3 closed) and 16-48K (S3+4 closed). As mentioned S1 is used to deselect the ROM overlay and is also needed if you used 7680 -8191 for anything other than character patterns and you want to use the 2040 printer which must be able to "read" the character patterns. Alternatively change the ROM printer routine to get your new and improved font style patterns else where. I hope that this freedom to experiment with the OS will lead to a lively followup on the software side.

Next [some future] installment, I will show you, how by duplicating the circuit with some small changes, you can control a 128K x 8 SRAM memory configured as RAMDISK memory. Of course the DIP switches can be replaced with a register to give you software controlled memory mapping and bank

switching and then the world's simplest and most effective battery back up circuit.

ZX81 CONNECTOR



* [at dip switch] = 10K pullup resistor network from 74HC251 pins 1, 4, 14 and 15 to +5V.

PLEASE NOTE

ATTENTION LIST Subscribers: When it is time to renew your membership, (look at your mailing label), please make out your check to Harvey Rait, LIST President or to Robert Malloy, Treasurer. PLEASE DO NOT MAKE OUT YOUR CHECK to LIST. Our bank requires a large amount of money in a savings account in order to cash checks. THANK YOU!

Harvey Rait
5 Peri Lane,
Valley Stream, NY 11581

Robert Malloy
412 Pacific Street,
Massapequa Park, NY 11762

Due to rising postage costs outside of the United States, we must raise our annual dues accordingly:

CANADA and MEXICO \$17.50 US, and the rest of the world \$24.00 US.

Bob Malloy, LIST Treasurer

NEW SPANISH SPECTRUM EMULATOR by Pedro Manuel Rodriguez Salas

[This reply to a query by John Pazmino relates to a new Spectrum emulator the IBM computers, which Mr Salas developed. The 'packs' he lists are sets of 100 assorted Spectrum games in BLK form; there are so far 600 distinct programs in the packs. He notes that his BLK format of file is the same as the universal TAP scheme and you may simply do a bulk rename of the files. After rehydrating the packs, do REN *.BLK *.TAP.]

[Mr Salas posted an announcement of new games for his Website. Please make a note of it for your visit.]

>PM> I will put a Spectrum game on my Spectrum 48K emulator page
>PM> every week. You can download it free. The game is in .BLK format, which
>PM> is compatible with .TAP format, simply rename the file. The URL is:
>PM>
>PM> <http://www.ugr.es/~pedrom/sinclair.htm>

[John Pazmino's round in the cyberconvo.]

JP> Hi!, I stopped at your site last week and did DL the emulator. It's
JP> still in ZIPfile and I hadn't opened it yet. I will, soonest. However,
JP> you said to ask on how to obtain the 'packs' of the games. Are they
JP> somewhere on your site in a large ZIPfile? Or is there a trick to
JP> getting them? Thanks.

{Pedro Salas explains about the game packs. Altho he offers to put up a requested game, you're best off getting them all in one blow in the packs.}

If you want to get one, two or three games I can put them in my page as soon as possible, but if you want to get one or more games packs the trick is this:

We send the games packs via mail on 3 1/2" disks. If you want them you must send a ordering form and a postal order in dollars (or equivalent in your country money).

The ordering form is this (if you want to register select the A option)

[Form is edited and reaaranged for clarity and space.]

Ordering form for registered version of the
Spectrum Emulator v2.00 by Pedro Manuel Rodriguez

+

Ordering form for games packs in blk format
and connector

Name _____

Address _____

City & Postcode _____

County _____ Country _____

Phone _____ Email/Fax _____

a() Registered Spectrum Emulator v2.00 * 25 US\$ = _____
plus some games

- b() Pack No.1 (100 games in blk format)
- c() Pack No.2 (100 games in blk format)
- d() Pack No.3 (100 games in blk format)
- e() Pack No.4 (100 games in blk format)
- f() Pack No.5 (100 games in blk format)
- g() Pack No.6 (100 games in blk format)
- h() Three games packs (select them) - 6 US\$
- i() Five games packs (select them) - 15 US\$
- j() Connector cassette-PC
- + Shipping and handling

* 15 US\$	=	
* 15 US\$	=	
* 15 US\$	=	
* 15 US\$	=	
* 15 US\$	=	
* 15 US\$	=	
* 39 US\$	=	
* 60 US\$	=	
* 10 US\$	=	
* 5 US\$	=	
=====		
Total \$US	=	

Send a postal order and ordering form to:

Pedro Manuel Rodriguez Salas
P.O.Box 39
18360 Huetor Tajar (Granada)
SPAIN

SIMPLE OUTPUT PORT FOR ZX81

BY G8V FH

Before a computer can be used to perform real tasks rather than just play games or carry out simple calculations it needs some means of actuating other devices.

The circuit shown in Fig. 1 is based on the output port designed for use with the *PW Structured Morse Learning Course*. The port in fact has eight output terminals only one of which can be at logic level 1 (+5V) at any given time. By POKEing different values into the appropriate address you can determine which terminal is energised and hence turn on and off anything which can be attached to the terminals.

The circuit shows two such devices. The Morse practice oscillator is attached to pin

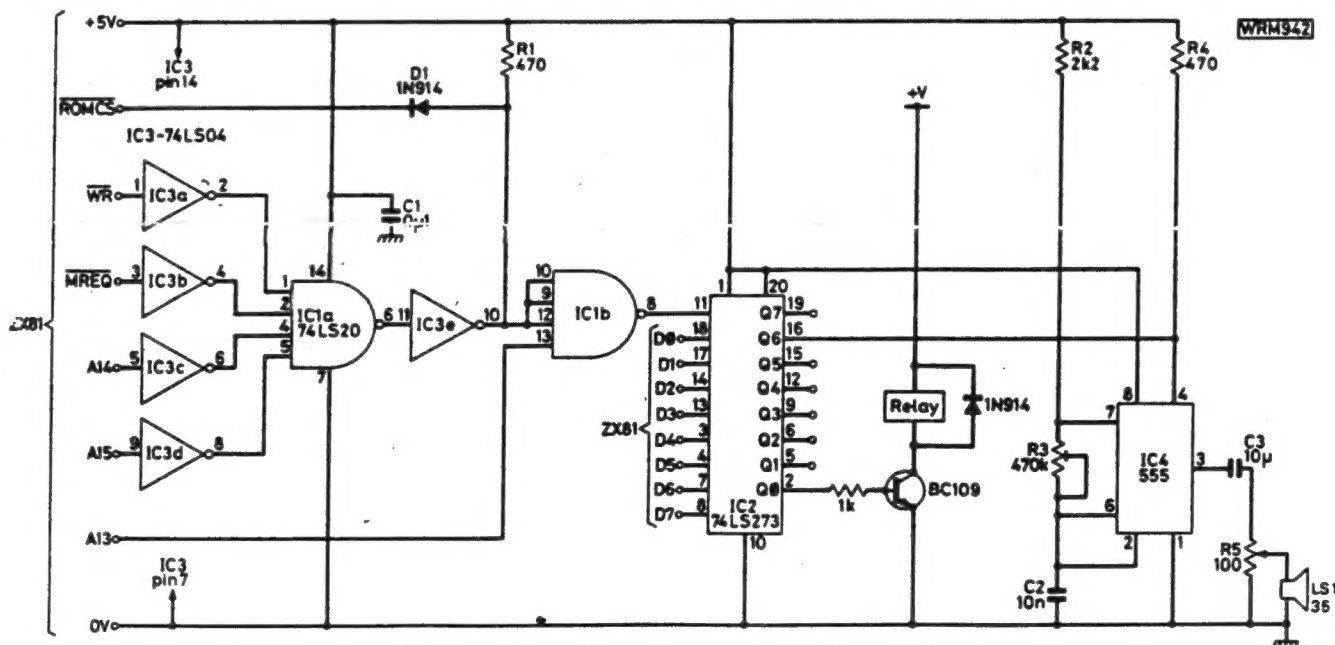
16 (Q6) and is switched on when Q6 goes high and off when it goes low. The transistor switched relay is connected to Q0 (pin 2) and the relay is energised when Q0 goes high. Note that the relay supply can be any positive voltage (e.g. 12V) and the relay would be chosen to suit this voltage.

The relay contacts could be used to drive a motor or switch an electrical load on and off at the command of the computer program. An example would be to switch the antenna rotator on and off as determined by the satellite tracking program on *PW Radio Programs — 1 "ORBITS"*.

A subroutine would need to be written to POKE 8192,16 if the antenna azimuth

needed altering and POKE 8192,0 to stop the rotator when it had achieved the correct position. Obviously some form of positional feedback would be required and this would need to be input into a suitable input port.

POKE 8192,	IC2 pin at logic 1	
0	All outputs low	
1	19	Q7
2	16	Q6
4	15	Q5
8	12	Q4
16	2	Q0
32	5	Q1
64	6	Q2
128	9	Q3



Note. Memotech 16K RAM packs. Set switches 1 and 3 down, 2 and 4 up.